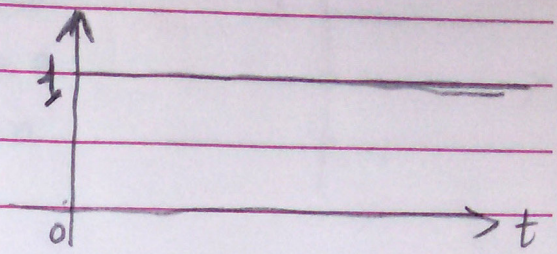
Page :
Date :

Fourier Transform of Finite-power signal

[2] Unit Step

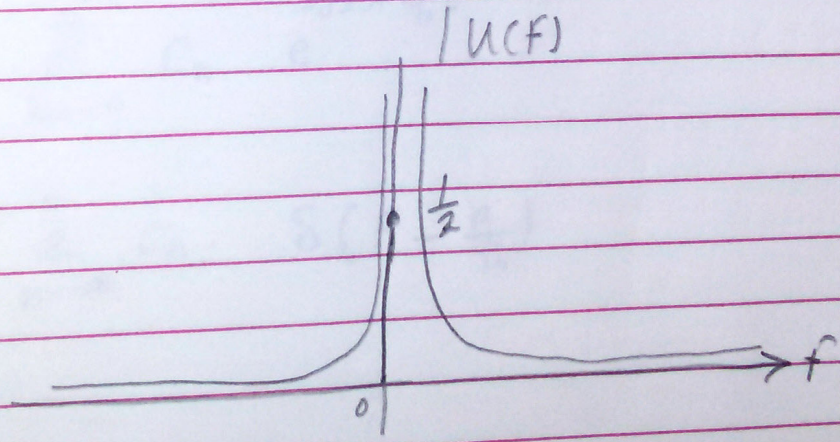
$$u(t) = \begin{cases} 1 & t \geq 0 \\ 0 & t < 0 \end{cases}$$



$$u(t) = \int_{-\infty}^{t} \delta(t)\, dt$$

$$u(t) \xrightarrow{F.T} \frac{1}{j2\pi f} + \frac{G(0)}{2}\,\delta(f)$$

$$u(t) \rightleftharpoons \frac{1}{j2\pi f} + \frac{\delta(f)}{2}$$

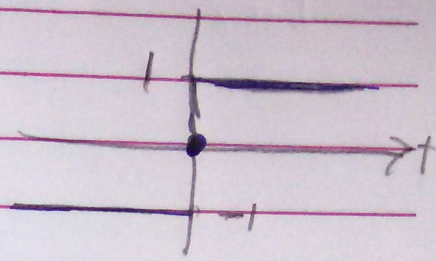


Spectrum of unit step

Page :
Date :

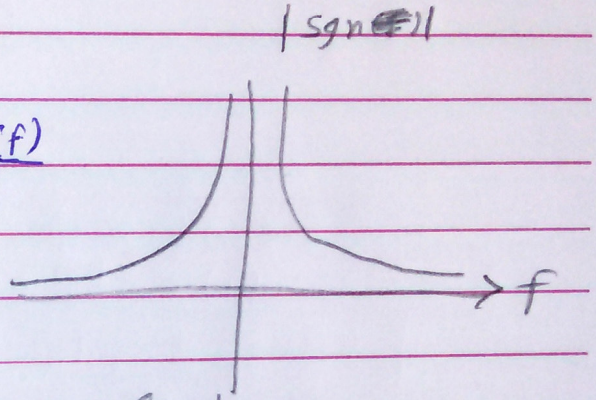
3 Signum Function

$$sgn(t) = \begin{cases} 1 & t > 0 \\ 0 & t = 0 \\ -1 & t < 0 \end{cases}$$



$$sgn = u(t) - u(-t)$$
$$= 2u(t) - 1$$

$$u(t) \rightleftharpoons \frac{1}{j2\pi F} + \frac{\delta(f)}{2}$$



$$sgn(t) \rightleftharpoons \frac{1}{j\pi f}$$

Spectrum

4 Periodic Functions

$$g_p(t) = \sum_{n=-\infty}^{\infty} C_n \cdot e^{-j2\pi \frac{n}{T_0} t}$$

$$G_p(f) = \sum_{n=-\infty}^{\infty} C_n \cdot \delta\left(f - \frac{n}{T_0}\right)$$

Page :
Date :

Gaussian function:-

$$g(t) = e^{-\pi t^2}$$

$$G(f) = e^{-\pi f^2}$$

Exponential function

$$g(t) = e^{-t} \cdot u(t)$$

$$G(f) = \frac{1}{1 + j2\pi f}$$